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ABSTRACT

This report includes the history and background of marine education in Hawaii, goals and objectives of marine education, guidelines for marine education implementation, and a proposed development plan for a marine education curriculum. The report also presents a general schedule of developmental activities that calls for the establishment of a steering committee that will monitor the development of a total environmental plan. The plan includes, among other things: a community resource identification program, a media resource identification program, a newsletter, and a curriculum development plan. (MH)

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A PROSPECTUS

A Report for

THE HAWAII MARINE EDUCATION COUNCIL

February, 1975

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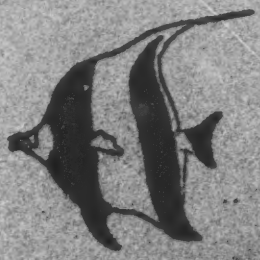

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INTRODUCTION

The curriculum of the school usually expresses the concerns of the community that it serves. Here in Hawaii, the island state, one might expect a major commitment to marine education, but ours is as land-locked a curriculum as any found in midwest America. Though surrounded by an idyllic sea, most of our people look to the land for both recreation and occupational opportunities.

It is not that our ocean has become inhospitable. It is the same ocean that lured the Polynesian voyagers of centuries past--the same bounteous ocean that supported a thriving culture in these islands for at least a thousand years before the arrival of the European explorers.

Why, then, does most of our citizenry ignore the sea? Much can be explained in the attitudes of various groups that have become influential in these islands over the past hundred years. In the latter part of the nineteenth century, the agricultural exploitation of the land became irresistible as a world market opened for Hawaiian sugar. With the introduction of pineapple at the turn of this century, Hawaii became a tropical plantation. Immigrants to Hawaii were peoples who came to work the fields. They knew the land, not the sea. Thus today the collective memory of Hawaii is dominated by a few thousand square miles of rich agricultural soil.

Though neglected, the sea remains a major lifeline for Hawaii's commerce, a fantastic recreational delight, and with new ocean technologies, a potential economic resource that may far outstrip our present land-based economy.

Increasingly, leaders in research, industry, and politics are bringing the potential of our marine environment to community consciousness. This renewed attention comes at a time when an array of international and local

issues and problems associated with the use of the sea stand ready to take center stage in Hawaii's economic and political life. These are major issues--archipelago status, territorial limits, international pollution, and coastline management--that will shape the Hawaii of both this and the next century.

It is the long-term nature of these issues that now generates concern in the educational community, for ignorance of the sea must be overcome if this and generations to follow are to cope rationally with our impending involvement with the marine environment. Clearly a program in marine education is needed now to begin the enlightenment of our children about the sea and its future. In this year 1975, forces seem aligned to begin development of such a program.

HISTORY AND BACKGROUND OF MARINE EDUCATION IN HAWAII

Prior to 1950, here in Hawaii there were a large number of commercial and military agencies whose primary activities were ocean related. The last twenty years has seen the establishment of a strong program in graduate ocean research and teaching. In the last eight years, there has been a major acceleration of teaching at the undergraduate level in marine-related areas. The pace of lower division University marine education has quickened particularly since the establishment of the Sea Grant College in 1968. This has been followed by an accelerating interest within the community in marine education programs for the primary and secondary schools of the state (see Figure 1).

Several events crucial to the emerging pre-collegiate marine curricular effort should be mentioned. The first was the establishment of the Council of Marine Science Teachers in the spring of 1973. This group represents teachers oi both public and private schols. Concurrently, the Sea Grant College made its Blue Water Marine program available to secondary teachers. As an outgrowth of both of these organized efforts, the Curriculum Research and Development Group (CRDG) was requested to consider the formal development of curriculum in the area of marine education.

Marine education became an official target of CRDG in November of 1973 when the CRDG advisory Title III Board accepted a proposal for curriculum design in the area of high school marine studies. In 1974, proposals were submitted to Sea Grant for the funding of an exploratory workshop in marine curriculum that was held in the summer of that year. At the same time, a planning grant was given that has resulted in the establishment of the Hawaii Marine Education Council and the Hawaii Marine Education Conference (see Appendix).

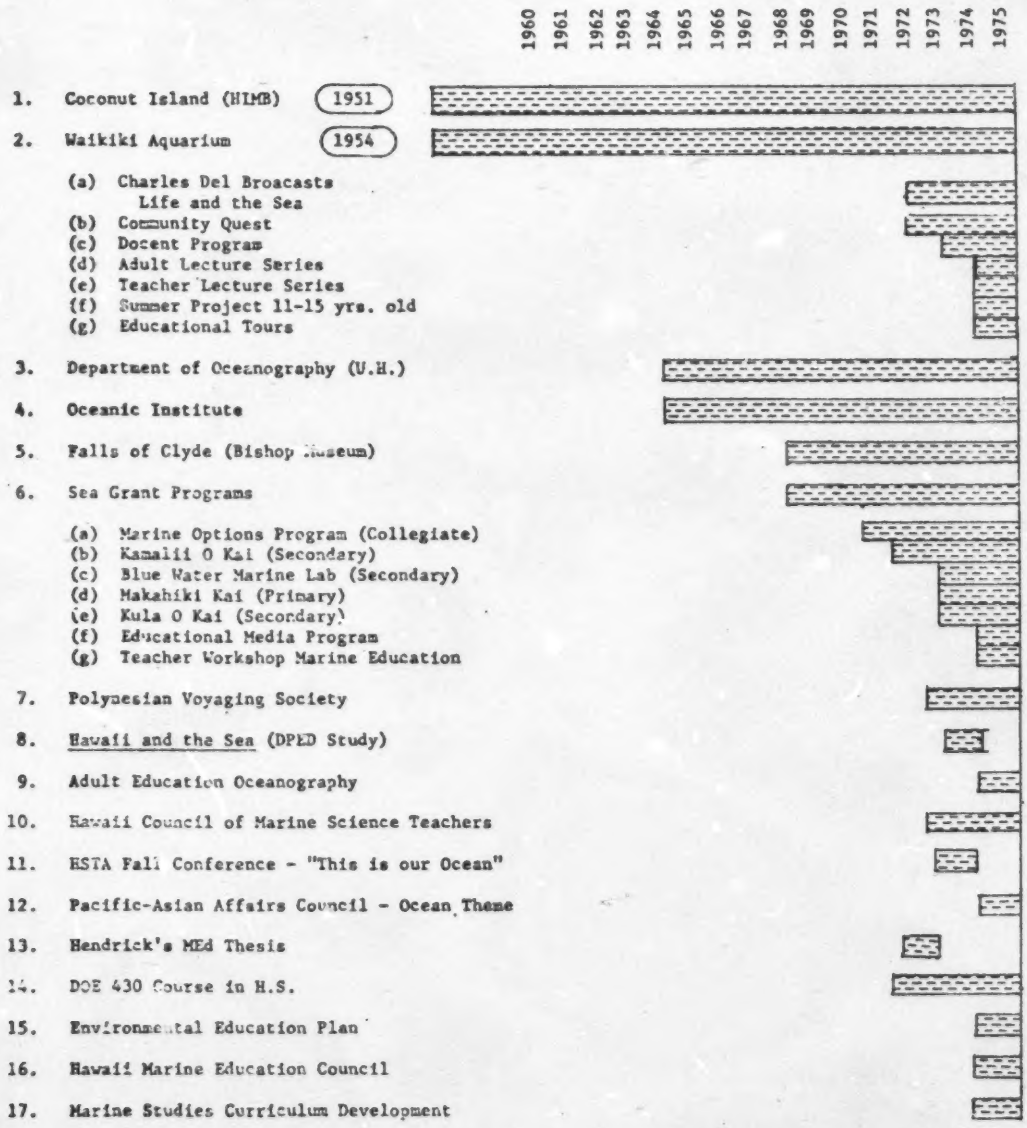


Figure 1. Marine Education Agencies and Activities
1960 - Present

THE HAWAII MARINE EDUCATION COUNCIL

This paper grows out of the deliberations of the Hawaii Marine Education Council, a consultive body to the Curriculum Research and Development Group (CRDG) of the College of Education of the University of Hawaii. The council is charged with producing a set of recommendations for marine education for the State of Hawaii preliminary to the development of specific curricula addressed to the study of the marine environment.

Make-up of the Council

The Marine Education Council has drawn upon the various groups in the Hawaiian community concerned with the marine environment. These include

1. Students, secondary and collegiate, currently concerned with marine education.
2. Teachers of the public and private schools of the State teaching or interested in a program in marine education.
3. Administrators of the Department of Education (DOE) who are charged with curriculum in the area of marine education.
4. Members of the development staff of Curriculum Research and Development Group who will be involved with the development of any marine curriculum.
5. Professional educational associations directly involved in areas that relate to marine education.
6. Faculty members of the University who have a professional interest that focuses on the marine environment.
7. Members of various state and county agencies with whom liaison will be necessary in establishing a viable marine education program.

8. Members of industry and labor interested in the general area of marine education.

(See Appendix for membership)

History of the Council

The Marine Education Council began its labors in the Fall of 1974. Under the leadership of Dr. Arthur Reed of the Department of Zoology, Ms. E. Barbara Klemm, and Dr. Francis Pottenger of the Curriculum Research and Development Group, the council was first convened in September and met regularly thereafter through December. The format of discussion was open and quickly led to substantial agreement on the need for a major curricular effort to provide materials, teacher training, and follow-up support for a program in marine education for the schools of Hawaii.

Action of the Council

Preliminary activities of the council were directed to finding the status of marine education in the State of Hawaii and the nation. A brief summary of the findings is presented here.

Survey of Elementary and Secondary Marine Education in Hawaii

A survey of the current status of the teaching of marine related subjects within the primary, intermediate, and secondary schools of the state reveals that such teaching has been confined principally to the high schools. Within the Department of Education system, there is an official course offering entitled Marine Science 430 (see Appendix) that is presently being offered in ten public schools. Five private schools presently offer a high school course in marine science. One public high school has a team-taught program of marine science and literature of the sea.

At the elementary level, a teacher's manual for field trips to tidepools has been developed for the Hawaii District. Save for incidental inclusion of topical materials, study of the marine environment is not otherwise formally pursued at the elementary schools.

Survey of Water Safety and Marine Education

The council has undertaken an extensive compilation of data concerning the swimming skills of Hawaii's children. This reveals that 1) over 60 percent of the students age 12-13 surveyed do not swim at all and have had no program in personal water safety and 2) of the remaining 40 percent over half do not have the basic skills necessary to swim 25 yards. The survey further reveals that many substandard swimmers are engaged in water recreational sports such as surfing.

It has also been found that over 75 percent of Hawaii's elementary and intermediate school children have never been on an oceangoing vessel. No formal water recreation program that gets students into the ocean currently exists in the schools, though pool-oriented athletic programs are available.

Survey of Field Trip and Liability Policies

Major concern has been expressed by teachers on the current status of field trip and associated liability policies of the DOE. Since programs addressed to the study of the ocean need the authentic laboratory of shore and open water, it is essential that students be allowed to make periodic field trips to the ocean. Several factors presently militate against this. There is 1) a general lack of funding for field trips and 2) an ambiguous set of DOE guidelines concerning permitted activities by students at the seashore (see Appendix).

Survey of the National
Curriculum Scene

Efforts have been made to collect samples of the various curricular materials that have been produced nationally and internationally in the area of marine studies. This material is being reviewed for its appropriateness for direct or modified inclusion into a general curriculum of marine education for Hawaii.

GOALS AND OBJECTIVES OF MARINE EDUCATION

The council has concluded that marine education must be considered part of the more inclusive environmental education program of the Department of Education and thus marine education shares general goals and objectives with that program. The special goals and objectives of marine education are set out here.

The goals of marine education are to develop awareness, knowledge, and understanding of the ocean's relationship to the total environment and the ocean's particular influence on man and society and to develop a commitment to the wise use of the oceans and all other environments.

The objectives of the marine education program are to enable students to develop

1. An awareness of
   a. the grandeur and aesthetic delicacy of the marine environment.
   b. the recreational delights of the marine environment.
   c. the holism of life, sea, land and atmosphere.
   d. change, past and present, and the agents of change in the marine environment.
   e. the distinction between man-made and natural marine environments.
   f. the limits and capacity of man to control the marine environment.
2. A knowledge of
   a. the literature of human interaction with the marine environment.
   b. the environmental arts pertaining to the marine environment.
   c. occupational opportunities associated with the marine environment.
   d. the influence of the marine environment on world culture and specifically, Pacific and Hawaiian cultures.

e. the technologies that bear on the marine environment.

f. the disciplines that study the oceans and bring insight to issues bearing on its use.

g. the natural principles that govern the marine environment.

h. the social, economic, and political dimensions of marine issues that confront Hawaii and the world.

i. vehicles for citizen participation in decisions pertaining to the marine environment.

3. Skill in

a. swimming and other marine recreational activities.

b. seeking knowledge of the marine environment.

c. probing problems for substance, weighing alternatives, and making considered decisions concerning action pertaining to the marine environment.

4. An ethical stance concerning man's use of the marine environment.

5. A concern and commitment to the wise management of the marine environment.

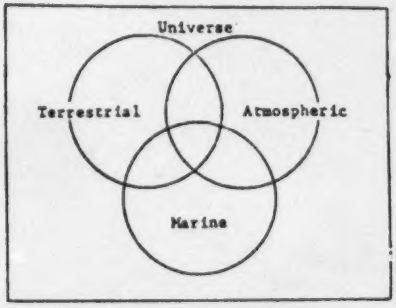
GUIDELINES FOR MARINE EDUCATION IMPLEMENTATION

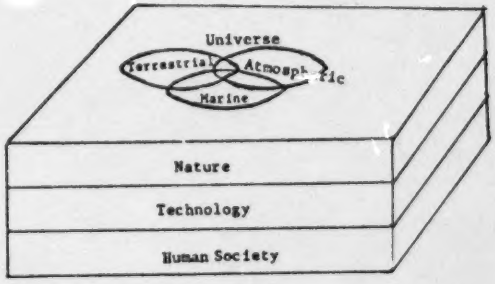
To ensure the orderly development of a marine education program for the state, the council has compiled the following set of guidelines:

1. That marine education should be part of a more comprehensive program in environmental education.
2. That marine education should be provided for all students in grades K-12.
3. That marine education is multi-disciplinary and should touch all of the course areas of the curriculum where there is a natural logic for the study of the marine environment.
4. That any program of marine education should be so designed as to utilize the various community resources that can contribute to an understanding of the marine environment.
5. That DOE policy limiting students' access to the marine environment should be a first target of the council.
6. That students should experience and know the marine environment intimately and that a full program of outdoor marine education should be developed.
7. That marine education should wherever possible capitalize on the structure of present programs of the schools, providing units with a marine character for substitution into the existing curriculum.
8. That programs providing teachers background in the area of marine education should be continued and expanded by the University.
9. That formal development of units to give substance to a marine education curriculum should be started as soon as possible by the Curriculum Research and Development Group.

MARINE EDUCATION IN ENVIRONMENTAL EDUCATION

It is recognized by the council that the marine environment is but one of three of the earth's natural environments--terrestrial, atmospheric, and marine--that should be understood by all students. These three environments have both biotic and abiotic components and are embedded in contexts of the natural universe which interfaces with man's technology which in turn is the product of human society. Human society is a corporate entity with multiple dimensions. It generates and recognizes issues and problems. It has its formal mechanisms of study, the disciplines of science, economics, politics, aesthetics, law, religion, morality, etc. Its origin is in individual perception. An attempt to encompass these elements diagrammatically is shown below.





The diagram indicates the scope of marine education and shows it to be logically tied into a wider program of environmental education. Most essential, it prescribes that a curriculum dealing with the environment must have structure that allows consideration of issues and problems, disciplinary studies and person.

To bring into being a curriculum that will reflect the study of the total environment, a general schedule of developmental activities has been tentatively sketched (see Figure 2). Structurally, this plan calls for the establishment of a steering committee that will monitor the development and implementation of a total environmental education plan. Included in the plan are the following:

Community Resource Identification Program: This program would involve the development of manuals for field trips and other activities within the community generally.

Media Resource Identification Program: This program would involve the cataloging of library materials and audiovisuals that can be purchased or otherwise acquired by schools or teachers as adjunct materials for the classroom and field environmental programs.

Newsletter: A newsletter would be published regularly to inform school personnel of activities in environmental education.

Curriculum Development: Curriculum development and dissemination would be undertaken in the areas of the sciences, social studies, language arts, the environmental arts, and physical education. These programs would be constructed for insertion within the existing structure of the DOE.

Evaluation: Concurrent with development, a program evaluation would be undertaken for each component of the overall plan.

Teacher Training: To ensure that teachers are adequately prepared to teach new materials, program-specific training would be made available in support of each curricular component.

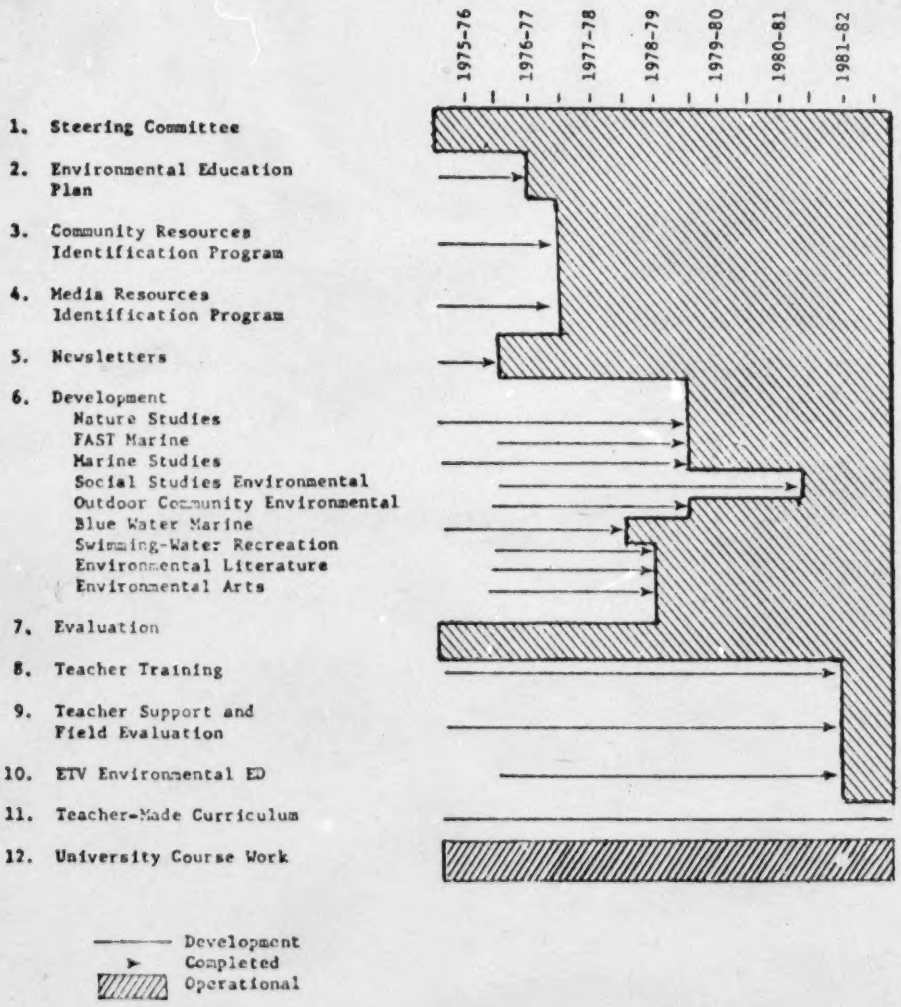


Figure 2: Proposed Environmental Education Development Schedule

Teacher Support and Field Evaluation: As a continuing service to the dissemination process, a teacher support service would be developed to help teachers in the utilization of materials. This support service would also be used as a vehicle of feedback for the continued revision of programs.

ETV Environmental Education: Each curricular component of Environmental Education would have an educational TV parallel. These ETV units would have a dual function: 1) They would act as a review of acitivites previously completed by students and 2) they would substitute as a first experience for students who have missed some part of the overall program.

Teacher-Made Curriculum: Teachers would be constantly encouraged to develop materials on their own which are compatible with the overall environmental education plan.

University Course Work: The University of Hawaii and other educational institutions would be requested to provide background course work in support of the total educational program.

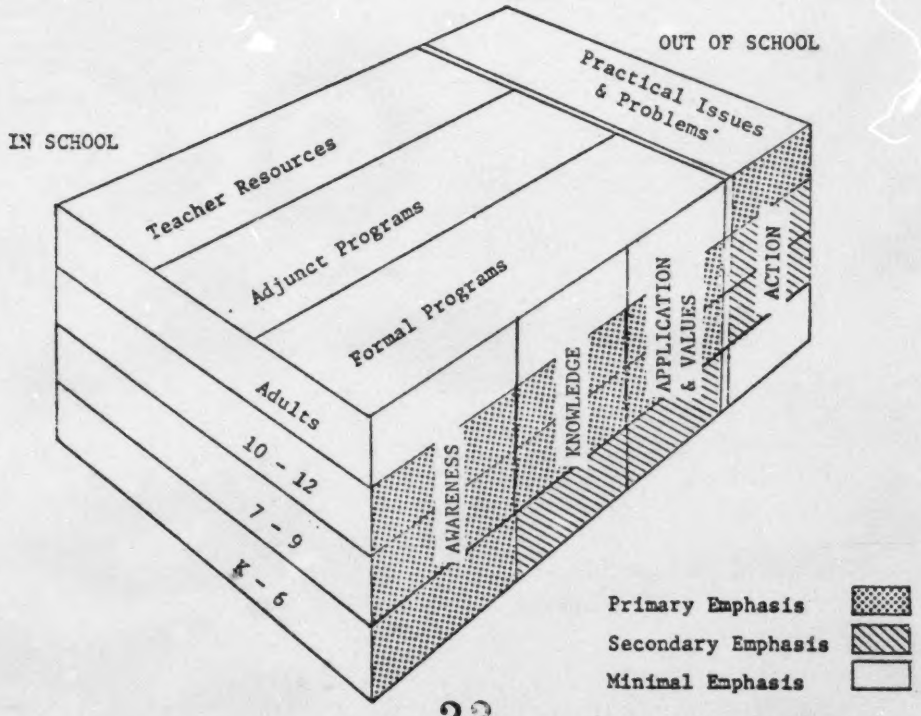
STRUCTURE OF THE MARINE EDUCATION

CURRICULUM FOR HAWAII

The elements of a marine education curriculum have been encapsuled in the diagram below. The three dimensions of the diagram set out the following:

1. On the vertical axis are arrayed the target populations to which the program is addressed.
2. On the horizontal axis are set set out the intellectual and activity objectives of the program.
3. On the projected axis are set out the programs and activities that will develop the objectives and test the goals.

MARINE EDUCATION



Goals and Objectives

The goals and objectives of the program are essentially four. The point of emphasis of the program associated with each of these objectives and goals will occur at different levels. They are

1. The development of awareness of the marine environment. This portion of the program will be an emphasis in all levels of the in-school program. The assumption is made that awareness must be constantly stimulated and extended to ever higher levels of sophistication if it is to become part of the personality of the adult.
2. The development of knowledge of the marine environment. This part of the program will be of primary focus in the intermediate and high school years where disciplinary studies are given more stress.
3. The development of skills in the application of knowledge and a value stance concerning the marine environment. This part of the program will also be emphasized in the intermediate and secondary schools. This glows out of the complexity of topics involving knowledge application.
4. Action in the discharge of professional and citizenship responsibilities. This will become the focal activity of the adult. Though there may be opportunity during the school years for students to become active in arenas outside the school, action in response to practical problems and issues is primarily an adult activity.

Program and Situations

The in-school program has three primary components:

1. The formal curricular component, consisting of the various courses and units taught within the school that have marine content.
2. An adjunct program involving field experience and non-formal activities.
3. A basic teacher resource support program to help in the structuring of the other two parts of the program.

The out-of-school extension is in the practical domain of personal interaction with issues and problems and will be primarily an adult activity. It is recognized that many students will become involved in action groups -- scouts, environmental groups, etc.

Target Groups

In keeping with the longitudinal nature of the program, four target populations are identified: grades K-6, 7-9, 10-12, and adult. These are divided according to the current predominant grade groupings of the DOE. The leveling is in some respects arbitrary and could readily be restructured into a primary-secondary, or a K-4, 5-8, 9-12, or any other desired grouping. The goal emphasis would still follow the same general distribution.

DEVELOPMENT OF THE MARINE EDUCATION CURRICULUM

The substance of the marine education program parallels the development structure of the general Environmental Education curriculum of the DOE. Figure 3 shows the elements and the projected time of development.

Details

The following description gives a deeper insight into the potential structure of elements of each component.

1. Hawaii Marine Education Council

   The Hawaii Marine Education Council was established in September 1974 and is an ongoing and functional component of the total organization for marine education. This body has devised a general plan for marine education within the state and will continue to function in a monitorial and evaluational capacity during the period of its implementation.

2. Community Resource Identification Program

   As a component of the adjunct program for marine education, field sites will be identified and listed in a general manual that will be made available to all teachers in the state. This manual will have the following parts: (1) a physical description of each field site, (2) a set of activities that prepare students prior to going to the site and are appropriate for different grade levels, (3) a set of activities that can be undertaken at the field site, and (4) a set of activities that can be used for in-class follow-up to the field site experience. It is projected

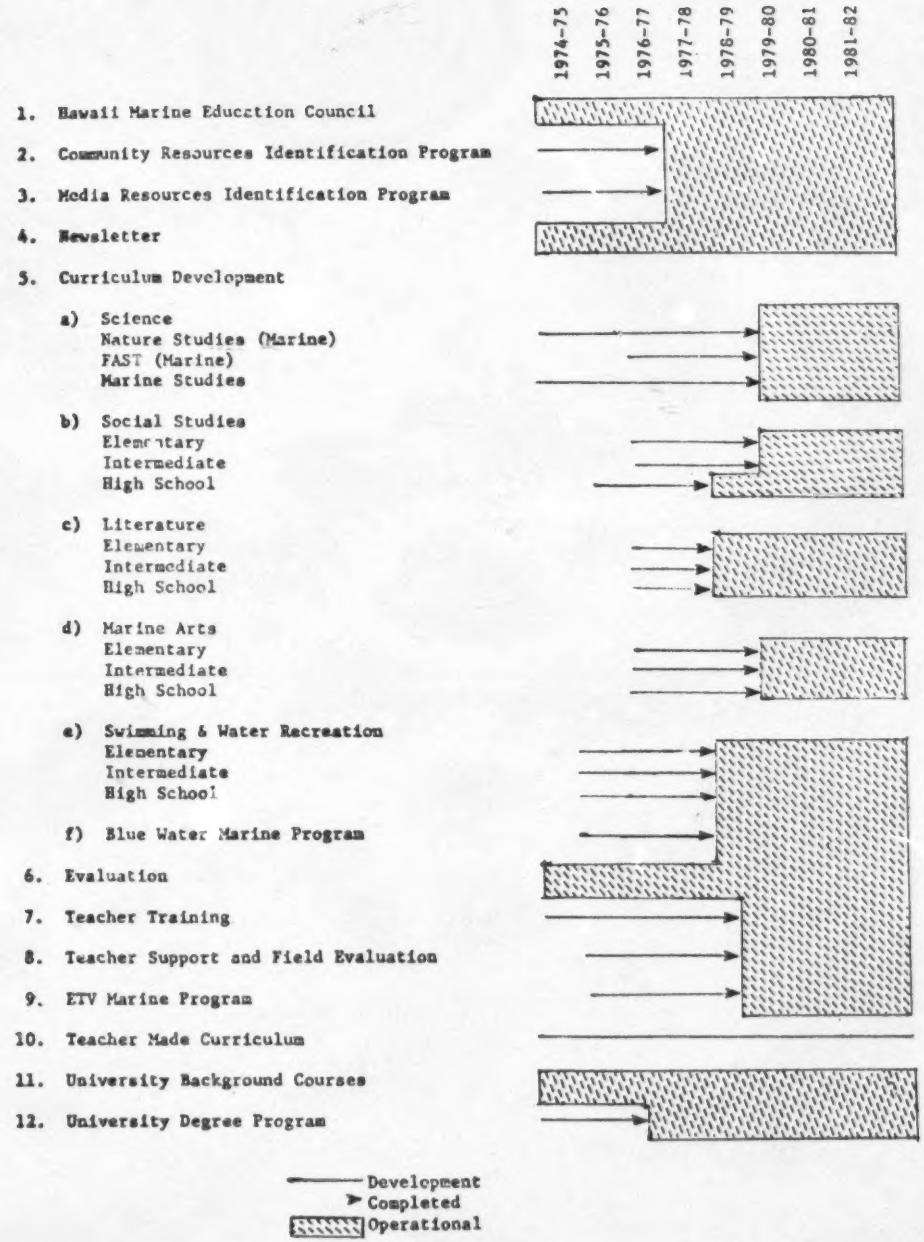


Figure 3: Components and Schedule for Development of the Marine Education Curriculum

that this manual will be distributed in inservice workshops. A manual will be produced for each island and development is scheduled for the two-year period academic years 1975-76 and 1976-77.

3. Media Resource Identification Program

This program will involve the identification and cataloging of appropriate library materials that can be purchased to broaden students' understanding of all aspects of the marine environment and man's interaction with it. This catalog will be available to teachers and school librarians for annual purchasing. In addition, a listing will be made of available audiovisual materials that can be purchased, rented, or otherwise obtained by schools and teachers. The developmental period will be the academic years 1975-76 and 1976-77.

4. Newsletter

A newsletter will be published that will be directed to topics associated with the developing marine education curriculum. Its immediate public will be school personnel within the State of Hawaii. First publication of this newsletter will begin in the academic year 1975-76.

5. Curriculum Development

In order to carry out the task of providing a multidisciplinary curriculum, a series of units must be constructed or found in extant programs for insertion into the present school curriculum.

a. Science

1. Elementary Nature Studies

Presently in CRDG, a program in elementary nature studies is being developed by Sister Edna Demanche. This program

is an environmental curriculum developed for grades K-6 which focuses on the local Hawaiian environment. As part of the program, there will be developed a set of experiences that will get students into the marine environment. Marine components will include seashore studies, field work at the Honolulu Aquarium as well as activities associated with classroom salt water aquaria, etc.

2. Intermediate FAST (Marine Component)

Foundational Approaches in Science Teaching (FAST) is a program for grades 7-9 that has been developed and is currently in operation within the schools of the state. Presently FAST is heavily rooted in terrestial and atmospheric study. The FAST materials will be augmented with a series of marine activities that will give better balance to the study of the total environment. This augmented material will include teacher's guides, resource booklets, and student problem sheets.

3. High School Marine Studies

Already in existence at the high school level are marine science programs that are taught under the DOE designation Marine Science 430. Currently these programs are teacher-made. To give support to teachers already utilizing this option and to increase the number of such classes, a course in marine studies will be developed at CRDG. This course will include studies of the biological, physical and earth science associated with the marine environment as well as technological considerations of known uses of the sea. This

development is presently in the process of preliminary exploration and will be given full developmental status beginning the summer of 1975. Projected completion date of this program will be the academic year 1978-79.

b. Social Studies

1. Elementary Program

A marine program in elementary social studies will be developed. This will consist of a series of units that deal with man's use of the ocean. Studies will include transportation, aquaculture, recreation, and mineral resources.

2. Intermediate Program

A program in intermediate marine social studies will be developed that will deal with the cultural impact of the ocean on various societies, particularly those of Hawaii and the Pacific basin. Consideration will be given to social values, law, and economics.

3. High School Program

A high school program will be developed in the area of coastline management and another in the area of ocean resources, law, and politics. Stress will be placed on problem clarification, social values, and decision. The social studies program will be designed to interface with the marine science program so that the content of one program can be used in the context of the other. Developmental time for each of the above three programs will be three years.

c. Marine Literature Program

1. Elementary Program

An elementary program in marine literature will be developed that will be compatible with the Hawaii English Project. This will consist of readings identified for students at different ability levels.

2. Intermediate and High School Program

A program in marine literature will be devised to be compatible with the Hawaii Secondary English Project. This part of the program will deal with topics that will be selected for interfacing with the science and social studies programs.

d. Marine Arts Program

1. Elementary Program

This program will deal principally with graphic arts that seek to use the sea as a source of aesthetic inspiration.

2. Intermediate and High School Programs

As part of the larger environmental arts program, the marine component will consider architectural designs for vessels and structures that are associated with the various maritime enterprises. Consideration will be given to aesthetic, economic, and ecological values.

e. Swimming and Water Recreation Programs

1. Elementary Program

A program in swimming and water safety will be developed for introduction into the elementary school. The principal thrust of this program will be basic swimming skills and water safety.

2. Intermediate and High School Program

This program will emphasize the recreational and competitive aspects of the marine environment. It is anticipated that these programs will begin development in 1975 and will take three years for completion.

f. Blue Water Marine Program

Already in existence is the Blue Water Marine program which takes students aboard an oceangoing vessel to introduce them to the various oceanographic activities of the professional oceanographer. Development of this program will include a curriculum package that will be compatible with the intermediate and high school science, social studies, and environmental programs described above. It is anticipated that the development of this program will be completed by academic year 1977-78.

6. Evaluation

Concurrent with the development of each of the programs above will be an appropriate evaluation package. This evaluation wil consider both the formative aspects necessary to support the improvement of the initial curriculum design and the summative aspects that give longitudinal study of the operational program. It is axiomatic that any program that does not have continual attention to improvement and modification of its original design will ultimately stagnate. Therefore evaluation will continue as part of the program even after operational status has been achieved. The principal agencies of evaluation will be DOE and CRDG.

7. Teacher Training

Associated with each of the developmental programs listed above will be program-specific teacher training. This teacher training will precede the utilization of the materials in the classroom and field.

8. Teacher Support and Field Evaluation

In support of the ongoing marine programs, a cadre of field support personnel will help teachers and will have responsibility for collecting formative evaluation information for the constant updating of the programs.

9. ETV Marine Program

The ETV component will have a dual function. First, it will act as a review component of courses in marine education that students have previously engaged in. This will ensure that students begin new programs with some common experiential basis. Second, this component will give students who have missed parts of the total marine education program an opportunity to see the kinds of activities that were engaged in and thus gain an initial experience before using materials that require a cumulative experience and knowledge base.

10. Teacher-Developed Curriculum

In addition to the formal program of adoption, adaptation, and design of new material, teachers will be encouraged to construct marine education materials on their own for use in their own classrooms. In support of this activity, general guidelines for sequence and continuity will be available. Such guidelines will help ensure that teacher-developed materials will incorporate essential elements of the total curriculum.

11. University Background Courses

The University of Hawaii is currently providing a series of lectures in various areas of marine topics. It is anticipated that this program will be intensified and made available for teachers on all islands.

12. University Degree Program

The University of Hawaii and other institutions of higher learning will be encouraged to develop marine education degree programs that will make it possible for teachers to gain an in-depth knowledge of marine education.